

WHAT IS CLAIMED IS:

1 1. In a communication system in which space-time encoded
2 data is transmitted at a first location and at least at a second
3 location for communication to a receive station, an improvement of
4 apparatus for the receive station for decoding the space-time
5 encoded data received thereat, said apparatus comprising:

6 a decoder coupled to receive indications of the space-
7 time encoded data received at the receive station, said decoder for
8 directly combining values of the space-time encoded data
9 transmitted from different ones of the first and at least second
10 locations to the receive station and for detecting values of
11 symbols of the data, once combined.

1 2. The apparatus of claim 1 wherein the space-time encoded
2 data transmitted at the first and at least second locations
3 comprises a space-time encoded block of data, and wherein said
4 decoder directly combines values of the space-time encoded block.

1 3. The apparatus of claim 2 wherein said decoder further
2 forms a sequence estimate, the sequence estimate formed of detected
3 values of the data, once combined.

1 4. The apparatus of claim 1 wherein the communication system
2 comprises a radio communication system, wherein the first location
3 at which the space-time encoded data is transmitted comprises a
4 first antenna transducer, wherein the second location at which the
5 space-time encoded data is transmitted comprises a second antenna
6 transducer, the second antenna transducer spaced apart from the
7 first antenna transducer, wherein the receive station comprises a
8 radio receiver, and wherein said decoder is coupled to receive
9 indications of the space-time encoded data received at the radio
10 receiver.

1 5. The apparatus of claim 4 wherein the space-time encoded
2 data transmitted at the first antenna transducer is transmitted
3 upon a first communication path to the receive station, wherein the
4 space-time encoded data transmitted at the second antenna
5 transducer is transmitted upon a second communication path to the
6 receive station, wherein the receive station comprises at least one
7 receive-antenna transducer coupled to transduce indications of the
8 space-time encoded data transmitted upon the first and second
9 communication paths, respectively, into electrical form, and
10 wherein the indications of the space-time encoded data to which
11 said decoder is coupled to receive are in electrical form,
12 subsequent to reception at the receive-antenna transducer.

1 6. The apparatus of claim 1 wherein the directly-combined
2 values of the space-time encoded data formed by said decoder
3 comprise a real-valued component portion and an imaginary-valued
4 component portion.

1 7. The apparatus of claim 6 wherein detected values of the
2 symbols of the data, once combined, formed by said decoder comprise
3 a detected value of the real-valued component portion and a
4 detected value of the imaginary-valued component portion.

1 8. The apparatus of claim 7 wherein the receive station
2 further comprises a detected-data value operation for operating
3 upon detected data, the detected data upon which said detected-data
4 value operates comprised of the detected values of the symbols
5 formed by said decoder.

1 9. The apparatus of claim 8 wherein the detected values of
the symbols formed by said decoder comprise at least a first block
of space-time decoded data symbol values.

1 10. The apparatus of claim 1 wherein the values of the space-
time encoded data transmitted at the first location and values of
the space-time encoded data transmitted at the second location are
correlated with one another and wherein said decoder includes a
5 matched filter for performing successive matched filter operations
6 upon the indications of the space-time encoded data received
7 thereat.

1 11. In a method for communicating in a communication system
2 in which space-time encoded data is transmitted at a first location
3 and at least a second location for communication to a receive
4 station, an improvement of a method for decoding the space-time
5 encoded data, once received at the receive station, said method
6 comprising:

7 directly combining values of the space-time encoded data
transmitted from different ones of the first and at least second
locations to the receive station; and

10 detecting values of symbols of the data, once combined
during said operation of directly combining.

12. The method of claim 11 wherein the space-time encoded
data transmitted at the first and at least second locations
comprises a space-time encoded block of data and wherein said
operation of directly combining comprises directly combining values
of the space-time encoded block.

1 13. The method of claim 12 further comprising the operation
2 of forming a sequence estimate, the sequence estimate formed of
3 detected values of the data detected during said operation of
4 detecting.

1 14. The method of claim 11 wherein the communication system
2 comprises a radio communication system, wherein the first location
3 at which the space-time encoded data is transmitted comprises a
4 first antenna transducer, wherein the second location at which the
5 space-time encoded data is transmitted comprises a second antenna
6 transducer, the second antenna transducer spaced apart from the
7 first antenna transducer, wherein the receive station comprises a
8 radio receiver, said operation comprising the further operation,
9 prior to said operation of directly combining, of receiving
10 indications of the space-time encoded data at the radio receiver.

1 15. The method of claim 14 wherein the space-time encoded
2 data transmitted at the first antenna transducer is transmitted
3 upon a first communication path to the receive station, wherein the
4 space-time encoded data transmitted at the second antenna is
5 transmitted upon a second communication path to the receive
6 station, wherein the receive station comprises at least one receive
7 antenna transducer and wherein said operation of receiving
8 comprises transducing indications of the space-time encoded data
9 transmitted upon the first and second communication paths,
10 respectively, into electrical form.

1 16. The method of claim 11 wherein directly-combined values
2 of the space-time encoded data formed during said operation of
3 directly combining comprises a real-valued component portion and an
4 imaginary-valued component portion.

1 17. The method of claim 16 wherein detected values of the
2 symbols of data detected during said operation of detecting
3 comprise a detected value of the real-valued component portion and
4 a detected value of the imaginary-valued component portion.

1 18. The method of claim 17 further comprising the operation
2 of operating upon detected data formed during said operation of
3 detecting.

1 19. The method of claim 18 wherein the detected values of the
2 symbols formed during said operation of decoding comprise at least
3 a first block of space-time decoded data symbol values.

1 20. The method of claim 11 wherein values of the space-time
2 encoded data transmitted at the first location and values of the
3 space-time encoded data transmitted at the second location are
4 correlated to one another and wherein said method further comprises
5 the operation of performing successive matched filter operations
6 upon the indications of the space-time encoded data received
7 thereat.